

MHT CET MEMORY-BASED QUESTION PAPER 2023
10 MAY 2023 SHIFT 1

PHYSICS

- Questions were from wave optics, rotational dynamics, KTG, current electricity, magnetism, etc.

CHEMISTRY

- Find bond order:
 N_2^+ , N_2^- , N_2^{+2} , CO
- Arrange the given molecules in increasing order of their acidic strength.
- Which of the following is a biodegradable polymer?
- Find the density of a given molecule (solid state).
- Which of the following is the correct representation of the Haber process?
- Identify the one differentiating characteristic between the Homoleptic complex and the Heteroleptic complex.
- Identify the product question on Sandmeyer/Gattermann/Balz-Schiemann reactions (any one).
- Match the type of linkage with their respective compound.
- Find the EAN of $[Co(NH_3)_6]^{2+}$.
- If the initial volume of gas is 3 dm^3 at $T = 300\text{K}$. At constant temperature, if the volume is doubled, then find the new pressure.
- Find molarity for the given conditions.

MATHEMATICS

- Find the coordinates of the point where the line through A (9, 4, 1) and B (5, 1, 6) crosses X axis.
- What is the number of solutions of $\tan x + \sec x = 2 \cos x$ if x belongs to $(0, 2\pi)$?
- Three vectors a, b and c are given. Find the equation of a vector that lies in the plane of vector a and vector b and whose projection on vector c is $1/\sqrt{3}$.
- Find the general solution of the differential equation:
 $\cos x (1 + \cos y) dx - \sin y (1 + \sin x) dy = 0$
- Considering only the principal value of an inverse function, the set: $A = \{ x \geq 0, \tan^{-1}x + \tan^{-1}6x = \pi/4 \}$, then A is...
 - i. an empty set
 - ii. a singleton set
 - iii. consists of two elements
 - iv. contains more than two elements
- Find k if $\int_0^{1/2} [x^2 dx / (1 - x^2)^{3/2}] = k/6$.
- If $\int_0^{\pi/2} \log(\cos x) dx = \pi/2 (\log(1/2))$, then find $\int_0^{\pi/2} \log(\sec x) dx$.
- If $ax + by + c = 0$ is normal to $xy = 1$, then determine if a and b are less than, greater than, or equal to zero.
- If a matrix $A = \begin{bmatrix} 1 & m & 2 \\ 1 & 2 & 2 \\ 1 & 3 & 3 \end{bmatrix}$ is adjoint of matrix B and $|B| = 5$, then find the value of m.
- $f(x) = 2x - 3$, $g(x) = x^3 + 5$, then find $[f \circ g]^{-1}(-9) = ?$

- Out of five siblings, what is the probability that the eldest and youngest children have the same gender?
- $\int (1/(\sin x + \cos x)) dx = ?$
- Find θ if $\sin\theta + \sin 4\theta + \sin 7\theta = 0$ and θ belongs to $(0, \pi)$.
- Find the area bounded by the curve $y = (49 - x^2)^{1/2}$ and x-axis.
- A (2,1,0), B (4,1,1), C (5,0,1), and P (2,1,6) are four given points, then find the image of P in plane ABC.
- When two coins are tossed, a person wins Rs 5 if two heads appears, Rs 2 if one head appears, and Rs 1 if no head appears. Find variance.